IN THE SPECIFICATION:

Page 1, immediately following the title, please insert the following:

This is the U.S. national phase of International Application No. PCT/GB03/04406 filed October 10, 2003, the entire disclosure of which is incorporated herein by reference.

The heading on page 1, line 2 has been changed as follows:

Field of the ~~Invention~~ Disclosure

The paragraph beginning on page 1, line 3 has been changed as follows:

This ~~invention~~ disclosure relates to organic optical devices ~~comprising~~ including a layer of heat treated organic material and methods for the production thereof.

The heading on page 1, line 5 has been changed as follows:

Background of the ~~Invention~~ Disclosure

The paragraphs beginning on page 3, line 12 have been changed as follows:

It is therefore a purpose of the ~~invention~~ disclosure to improve the lifetime of organic semiconducting materials, in particular blue electroluminescent materials.

~~Summary of the invention~~ General Description

In a first aspect, the ~~invention~~ disclosure provides a method of forming an optical device ~~comprising~~ including the steps of:

The paragraphs beginning on page 4 line 11 have been changed as follows:

Preferably, the first electrode is an anode and the second electrode is a cathode. Preferably, the cathode ~~comprises~~ is a metal having a workfunction of less than 3.5 eV. More preferably, the cathode ~~comprises~~ is a layer of calcium.

Preferably, a layer of dielectric material is located between the polyfluorene and the cathode. Preferably, the layer of dielectric material ~~comprises~~ is a metal fluoride.

~~A method according to any preceding claim wherein~~ In a preferred embodiment, a layer of conductive organic material to provided between the first electrode and the first layer. Preferably, the layer of conductive organic material is PEDT / PSS.

Preferably, the polyfluorene ~~comprises~~ includes a plurality of regions including at least two of a hole transporting region, an electron transporting region and an emissive region.

Preferably, the polyfluorene ~~comprises~~ includes a hole transporting region, an electron transporting region and an emissive region.

The paragraphs beginning on page 4, line 24 have been changed as follows:

In a second aspect, the ~~invention~~ disclosure provides an optical device obtainable by the disclosed method ~~according to the first aspect of the invention~~. Preferably, the optical device is an electroluminescent device.

In a third aspect, the ~~invention~~ disclosure provides a method of forming an optical device ~~comprising~~ including the steps of:

The paragraph beginning on page 5, line 10 has been changed as follows:

In a fourth aspect, the ~~invention~~ disclosure provides an optical device obtainable by the disclosed method ~~according to the third aspect of the invention~~. Preferably, the optical device is an electroluminescent device.

The paragraphs beginning on page 5, line 15 have been changed as follows:

~~The inventors have surprisingly found that the~~ The lifetime of a polyfluorene, in particular a blue electroluminescent polyfluorene, may be improved by a combination of pre- and post-cathode heat treatment. This combination has been found to lead to a greater increase in lifetime than only one of either pre- or post-cathode heat treatment.

~~It has been found that the~~ The temperature of the heat treatment, in particular heat treatment above or below Tg, has little or no effect on lifetime. However, higher efficiency is maintained at temperatures around or below the Tg of the electroluminescent material.

The paragraphs beginning on page 5, line 23 have been changed as follows:

The ~~present invention~~ disclosure will now be described in further detail, by way of example only, with reference to the accompanying drawings in which:

FIGURE 1 shows a PLED or photovoltaic device prepared according to the method of the ~~invention~~ disclosure; and

FIGURE 2 shows a graph of luminance vs. time of a PLED according to the ~~invention~~ relative to devices not heated or subjected to only one of pre- or post-cathode heating.

The heading on page 6, line 1 has been changed as follows:

Detailed Description ~~of the Invention~~

The paragraph beginning on page 6, line 2 has been changed as follows:

With reference to ~~figure~~ Figure 1, a PLED or photovoltaic device prepared according to the disclosed method ~~of the invention comprises~~ includes a substrate 1, an anode 2 of indium tin oxide, a layer 3 of organic hole transport material, a layer 4 of organic semiconducting material or materials, an electron transporting layer 5 and a cathode 6.

The paragraph beginning on page 6, line 16 has been changed as follows:

Cathode 6 is selected in order that electrons are efficiently injected into the device and as such may comprise a single conductive material such as a layer of aluminium. Alternatively, it may ~~comprise~~ include a plurality of metals, for example a bilayar of calcium and aluminium as disclosed in WO 98/10621. A thin layer of dielectric material 5 such as lithium fluoride may be provided to assist electron injection as disclosed in, for example, WO 00/48258.

The paragraphs beginning on page 6, line 29 have been changed as follows:

The organic semiconducting material or materials ~~comprising~~ makeup of the layer 4 may be polymers or small molecules. Examples of suitable semiconducting polymers are disclosed in Adv. Mater. 2000 12(23) 1737-1750 and references therein. A single polymer or a polymer blend may be deposited from solution to form the layer 4. Where a plurality of polymers are deposited, they preferably ~~comprise~~ include a blend of at least two of a hole transporting polymer, an electron transporting

polymer and, where the device is a PLED, an emissive polymer as disclosed in WO 99/48160. Alternatively, the layer 5 may be formed from a single second semiconducting polymer that comprises regions selected from two or more of hole transporting regions, electron transporting regions and emissive regions as disclosed in, for example, WO 00/55927 and US 6353083. Each of the functions of hole transport, electron transport and emission may be provided by separate polymers or separate regions of a single polymer. Alternatively, more than one function may be performed by a single region or polymer. In particular, a single polymer or region may be capable of both charge transport and emission. Each region may comprise a single repeat unit, e.g. a triarylamine repeat unit may be a hole transporting region. Alternatively, each region may be a chain of repeat units, such as a chain of polyfluorene units as an electron transporting region. The different regions within such a polymer may be provided along the polymer backbone, as per US 6353083, or as groups pendant from the polymer backbone as per WO 01/62869.

In addition to the layer 4, the optical device may optionally ~~comprise~~ include further layers of organic semiconducting material. In particular, a plurality of layers of organic semiconducting materials may be provided as an alternative to a blend of those materials.

The organic semiconductor of the layer 4 is preferably a polyfluorene. Examples of suitable fluorene repeat units for a polyfluorene include 2,7-linked 9,9 dialkyl fluorenes, 2,7-linked 9,9 diaryl fluorenes, 2,7-linked 9.8 spirofluorenes (as disclosed in EP 0707020) and indenofluorenes (as disclosed in Adv. Mater. (2001), 13(14), 1096-1099).

The heat treatment of the optical device is preferably at temperatures up to and including the Tg of the organic semiconducting material. Practically, the lowest

temperature for the heat treatment is around 60-70°C. The heat treatment may last from around ~~2~~ two minutes up to 12 hours, preferably around 10 minutes up to ~~1~~ one hour. The length of time of the heat treatment depends in part on the temperature - e.g. where heat treatment is at or around the Tg of the organic semiconducting material, the time for the heat treatment is reduced accordingly. In addition, the efficiency of heat transfer from the heat source (e.g. a hotplate or an oven) to the optical device should be taken into account in determining this length of time. Heat treatment should take place in an inert environment, such as a nitrogen atmosphere, due to the susceptibility of organic semiconducting materials, and many cathodes, to degradation in air.

The optical device prepared according to the disclosed method ~~of the invention~~ is preferably a PLED when the first and second electrodes inject charge carriers. In this case, layer 4 is a light emitting layer.

The optical device is preferably a photovoltaic device or photodetector when the first and second electrodes accept charge carriers. In this case, the second layer preferably ~~comprises~~ is formed of a polymer or polymers capable of hole and electron transport.

The paragraph beginning on page 9, line 6 has been changed as follows:

A device was prepared in accordance with ~~example~~ Example 1 except that the device was not heated.

The paragraph beginning on page 9, line 8 has been changed as follows:

A device was prepared in accordance with ~~example~~ Example 1 except that the device was only subjected to pre-cathode heating.

The paragraphs beginning on page 9, line 11 have been changed as follows:

A device was prepared in accordance with ~~example~~ Example 1 except that the device was only subjected to post-cathode heating.

As can be seen from Figure 2, the lifetime of the device according to the ~~invention~~ disclosure was improved relative to any of the devices treated in accordance with the comparative examples.

The paragraph beginning on page 9, line 19 has been changed as follows:

Although the ~~present invention~~ disclosure has been described in terms of specific exemplary embodiments, it will be appreciated that various modifications, alterations and / or combinations of features disclosed herein will be apparent to those skilled in the art without departing from the spirit and scope of the ~~invention~~ disclosed method and device as set forth in the following claims.